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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/481,351	01/12/2000	DAVID R. PAYNE	082380-00339	5540

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EXAMINER	
ADDIE, RAYMOND W	
ART UNIT	PAPER NUMBER

3671

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/481,351	PAYNE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Raymond W. Addie	3671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 04 March 2003.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.
- Disposition of Claims**
- 4) Claim(s) 12-20,22 and 24-78 is/are pending in the application.
- 4a) Of the above claim(s) 12-20 and 22 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 24-78 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All b) Some \* c) None of:  
1. Certified copies of the priority documents have been received.  
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Objections***

1. Claim 25 is objected to because of the following informalities:

Line 33, the phrase "automated functions comprises the guidance control function is automatically operated,". Should be --automated functions comprises the guidance control function;--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 60-62 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for providing a plurality of sensors for detecting an operating speed of an engine of a drilling apparatus, does not reasonably provide enablement for regulating the output of an engine in response to an engine output signal. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. Because neither the claims nor the specification provides means for detecting an engine output, nor means for the main control circuit to regulate the engine output in response to an engine output signal, one of ordinary skill in the art, would not know how to perform the function as claimed.

It should be noted the claims do not positively recite an engine output sensor capable of generating or transmitting an engine output signal.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 60-62, 77 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 60 recites the limitation "the engine output signal" in line 11. There is insufficient antecedent basis for this limitation in the claim. It is indefinite as to how the claimed engine output signal is generated and transmitted, since no structure capable of performing the function is claimed.

In regards to Claim 77, line 2 recites "controlling supply of fluid to the underground tool by maintaining fluid flow at a predetermined flow rate". However, lines 3-4 recite "and a flow rate is above a predetermined rate".

It is indefinite how the method step of "maintaining fluid flow at a predetermined flow rate"; when the predetermined flow rate has already been exceeded.

Therefore, the recitation "a flow rate is above a predetermined flow rate" is interpreted to claim --a flow rate at a predetermined flow rate--.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 24, 72-74, 77, 78 are rejected under 35 U.S.C. 102(e) as being anticipated by

Alft # 6,308,787 B1.

Alft discloses a method for using a horizontal drilling machine having a plurality of automated functions, the machine comprising a drill string to which an underground tool is attached. The method comprising:

Selecting a path along which the underground tool is to be used.

Axially advancing the drill string so as to move the underground tool along at least a portion of the selected path, while automatically operating at least one of the plurality of automated functions of the drilling machine.

Wherein the underground tool can be advanced in a particular direction by automatically rotating and/or thrusting the drill string.

Further, Alft does specifically recite advancing the drill string until the drill string must be lengthened, it is inherent from the disclosure of Alft, that the drill string cannot be further advanced until the rotation motor (19) automatically threads a new drill string member (23) to the up hole end of the drill string (22). See Col. 13, Ins. 5-20; col. 30, col. 40, 43.

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In regards to Claim 72 Alft discloses the underground tool can be used in a backreaming operation and is operated by automatically rotating and pulling back the drill string until the drill string must be shortened and is further capable of automatically unthreading a drill string member (23) from the drill string (22). See col. 30.

In regards to Claims 73, 74 Alft discloses during a back reaming operation, the drilling machine is operated by automatically reducing a rate of pullback, in response to a rotation pressure or product tension being greater than a predetermined limit.

See col. 30.

In regards to Claim 77 Alft discloses automatically controlling the supply of fluid to the underground tool by maintaining fluid flow at a predetermined flow rate when drill string is being advanced, a fluid pressure, flow rate is at or above a predetermined rate

In regards to Claim 78 Alft discloses automatically identifying a position of the underground tool by:

Sensing a roll position of the underground tool.

Sensing a pitch of the underground tool.

Sensing an orientation of the underground tool.

Sensing a temperature of the underground tool.

Calculating the position of the underground tool.

See Figs. 3A-3E; col. 5, Ins. 1-30; Col. 16, Ins. 15-60.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25, 57-72, are rejected under 35 U.S.C. 103(a) as being unpatentable over Alft # 6,308,787 B1.

Alft discloses a horizontal drilling system comprising:

A horizontal drilling machine (12).

A drill string (22).

A drive system (17, 19) operatively connectable to a 1<sup>st</sup> end of the drill string. Said drive system being adapted to advance the drill string through the earth.

A down hole tool (24) connectable to a 2<sup>nd</sup> end of the drill string.

A pipe handling assembly adapted to extend and reduce the length of the drill string by automatically adding or subtracting a drill string member (23).

See Cols. 12-13.

A fluid dispensing assembly adapted to deliver fluid, such as mud and water, to the downhole tool (24).

A machine control system (25) adapted to operate the drilling machine.

Said control system comprising:

A plurality of sensors (27, 152, 162, 167, 168, 189, 195, 198). Each sensor adapted to sense data relative to at least one of a plurality of parameters defining the operation or environment of the drilling machine.

A main control circuit (72, 74), see col. 13, Ins. 45-58, adapted to receive data from the plurality of sensors and automatically operate the drilling machine in response to the data.

Wherein at least one of the plurality of automated functions is selected from the group comprising a pipe handling function, a power management function, a guidance control function, a fluid control function and a tracking function.

Wherein, when the plurality of automated functions comprises a power management function, the plurality of sensors comprises an engine (169) speed monitor (72) adapted to detect an operating speed of an engine/motor/pump and transmit and an engine output signal (Cs). See col. 18, Ins. 45-48; Col. 40 in its entirety, emphasis in Ins 59-67. A thrust circuit input sensor adapted to monitor input to the drive system and transmit a thrust input signal.

See col. 12, In. 53-Col. 13, In. 20; Col. 15, Ins. 25-39; Col. 16, Ins 45-53

A rotation circuit input sensor adapted to monitor input to the drive system and transmit a rotation input signal. See col. 16, Ins. 45-53.

A fluid circuit input sensor adapted to monitor input to the fluid dispensing assembly and transmit a fluid input signal. See col. 18, Ins. 48-50.

Wherein, when the plurality of automated functions comprises the guidance control function; the plurality of sensors comprises a thrust output sensor adapted to monitor thrust applied to the drill string and transmit a thrust output signal. A rotation circuit sensor adapted to monitor rotation applied to the drill string and transmit a rotation output signal. A carriage position sensor adapted to monitor a relative position of a (thrust/pullback) carriage (19). and transmit a carriage position signal.

Wherein, when the plurality of automated functions comprises the fluid control function, the plurality of sensors comprises an operating sensor adapted to transmit an operating signal when the fluid dispensing system is required to be operational.

A flow rate sensor adapted to monitor the rate of flow from the fluid dispensing system and transmit a flow rate signal. A fluid pressure sensor adapted to monitor the output of the fluid dispensing system and transmit a fluid pressure signal and a flow sensor adapted to detect presence of fluid flow and transmit a fluid flow signal.

Wherein, when the plurality of automated functions comprises the tracking function; the plurality of sensors comprises roll, pitch and azimuth sensors, each adapted to detect and transmit a roll, pitch and azimuth orientation signal respectively, of the downhole tool (24). A temperature sensor adapted to detect a temperature at the downhole tool and transmit a temperature signal.

Although Alft does not specifically recite individual sensors for each automated function, Alft clearly discloses each automated function is performed in "real-time" and transmits data regarding each of the automated functions to a central processor (25);

in order to permit "real time" safety oriented control, to change a particular boring machine or boring tool operation given the dynamics of a given applications.

See Col. 16, Ins. 45-61. See also Col. 3, lines 5-20, Col. 12, lines 24-col. 13, line 43; col. 14, lines 48-60, col. 15, lines 5-25, col. 18, lines 35-col. 19, line 55, col. 27, lines 16-43, Cols. 37-42 in their entirety.

In regards to Claims 57 Alft discloses the drive system further comprises a thrust circuit adapted to thrust the drill string and a rotation circuit adapted to rotate the drill string.

In regards to Claim 60 Alft discloses when the plurality of automated functions comprises the power management function, the plurality of sensors further comprises:  
A thrust circuit output sensor adapted to monitor an output of the thrust circuit and transmit a thrust output signal.

A rotation circuit output sensor adapted to monitor an output of the rotation circuit and transmit a rotation output signal.

A fluid circuit output sensor adapted to monitor an output of the fluid dispensing assembly and transmit a fluid output signal.

Wherein, the main control circuit is adapted to regulate output of the engine in response to the engine output signal, the thrust input signal, the rotation input signal, the fluid input signal, the thrust output signal, the rotation output signal and the fluid output signal to automatically operate the power management function. See Cols. 39-40.

In regards to Claims 63, 64, 71, 72 Alft discloses the main control circuit (74) is further adapted to automatically operate the guidance function and a tracking function when the downhole tool is to be advanced in a particular direction by operating the drive system to rotate and/or thrust, the drill string to a desired orientation (to include roll position signals, orientation signals, pitch and yaw signals) indicating a change of direction is required or the drill string must be lengthened. See Col. 30, 39-40, col. 42.

In regards to Claim 65 Alft discloses when the plurality of automated functions comprises the guidance function, the plurality of sensors further comprises:  
A rotation circuit speed sensor, adapted to monitor to monitor a rotational speed of the drill string and transmit a rotational speed signal.  
A product tension sensor adapted to detect a tension/stress/pressure at the downhole tool and transmit a product tension signal.  
Wherein the main control circuit is adapted to operate the drive system in response to the thrust output signal, the rotation output signal, the carriage position signal, the rotational speed signal and the product tension signal to automatically operate the guidance control function. See Col. 40, 43.

In regards to Claim 66, Alft discloses the main control circuit is further adapted to automatically operate the guidance function when the downhole tool is used in a backreaming operation, by operating the drive system to rotate and pullback the drill string until the drill string must be shortened by unthreading a drill string member (230 from the drill string. See col. 30, Ins. 19-37.

In regards to Claims 67, 68 Alft discloses the main control circuit (74) is further adapted to control a rate of pullback in response to a variety of sensor signals, such as generated by sensors (152, 162). See col. 40. Ins. 16-27; col. 43.

In regards to Claims 69 Alft discloses the main control circuit is further adapted to automatically operate the fluid control function by operating the fluid dispensing assembly to stop or maintain fluid flow at a predetermined flow rate when operating sensors indicate fluid is required, a fluid pressure is at a predetermined limit and/or a flow rate is above a predetermined rate.

It should be noted that Alft further discloses controlling the viscosity and composition of the fluid based on sensor signals representing a variety of geophysical and machine operating characteristics. See col. 5, Ins. 3-31.

In regards to Claims 58, 59, 61, 62 Alft discloses the main control circuit (74, 72) further adapted to control engine performance and operation at all operating speeds, based on signals from various geophysical and machine operating sensors to include engine control signals (Cs) from the central processor (72). See col. 40, 43.

***Response to Arguments***

6. Applicant's arguments filed 3/4/2003 have been fully considered but they are not persuasive; with respect to Claims 24, 72-74, 77, 78.

Applicant argues against the 35 U.S.C 102(e) rejection as being anticipated by Alft by stating "Alft does not disclose use of the machine where an underground tool is advanced in a straight line by automatically rotating and thrusting the drill string until a change of direction is required or the drill string must be lengthened".

Applicant supports the argument by further stating "Alft does not disclose...advance(ing) the underground tool...by rotating the underground tool to a desired roll orientation and advancing the drill string with the tool at the roll orientation for a predetermined distance or until the drill string must be lengthened".

However, the Examiner does not concur.

Claim 24 does put forth the claim limitations cited above in the alternative form. To that affect, Alft clearly discloses advancing the underground tool (24) based on a preprogrammed path, as well as "on the fly" adjustments to the intended drilling and back reaming paths, said adjustments being in response to signals from the main

control circuit (72, 74), as well as a variety of geophysical and machine operating sensors for automated control of advancing the underground tool (24) and drill string member (23) coupling and decoupling, as clearly put forth in Paragraph 4 above.

In regards to New Claims 72-78 the Applicant argues "dependent claims, depending directly or indirectly from independent claim 24.

However, Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Therefore the arguments are not persuasive.

Applicant's arguments with respect to claims 25, 57-71 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Response to Amendment***

7. Applicant's amendment to Claim 25 has introduced several "wherein statements" that put forth additional functional limitations the sensor units are adapted to perform. Since the prior art reference cited in the Last Office Action did not clearly anticipate each and every limitation of the "wherein" statements Aift # 6,308,787 does disclose the

necessary structure, sensors, control circuits, and necessary drilling apparatus, capable or at least adaptable to perform the cited functional limitations put forth in amended Claim 25, as put forth above, in Paragraph 5.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Addie whose telephone number is (703) 305-0135. The examiner can normally be reached on Monday-Friday from 8:00 am to 2:00 pm, 6-8 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will, can be reached on (703) 308-3870. The fax phone number for this Group is (703) 305-8623.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1113.



**Thomas B. Will**  
**Supervisory Patent Examiner**  
**Group 3600**

**RWA**  
**4/1/2003**